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**Stereoscopic PIV Measurements of Flow Through the Doorway of an Enclosure Fire Analogue**

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Stereoscopic PIV measurements were conducted to measure flow velocity in the doorway of a reduced-scale enclosure. The experiment was a fluid analogue of a full scale fire test employing a helium plume as the buoyant source to induce the countercurrent flows in a vent opening typical of developing fires in an enclosure. Average mass flow rate of air entering the enclosure and mass flow rate of air leaving the enclosure was computed from the velocity and oxygen concentration measurements used to infer gas density. All three components of the velocity vector field were measured and the results show the three dimensional structure of the flow through the doorway. A comparison of the velocity magnitude and the horizontal velocity component perpendicular to the doorway,  $u$ , shows that  $u$  doesn't always dominate in its contribution to the velocity magnitude; a critical assumption of typical bi-directional probe measurements. The interface of the two flows defines the integration limits for computing the mass flow rates. It is located with a finer resolution than achieved with probe measurements. This reduced-scale fluid analogue experiment served as an intermediate scale to address the technical challenges of large-scale PIV measurements before application in full scale fire tests.

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